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Henry O. Marcy.

THE

15.

RADICAL CURE OF HERNIA

BY THE

ANTISEPTIC USE OF THE CARBOLIZED
CATGUT LIGATURE.

BY

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CAMBRIDGE MEDICAL IMPROVEMENT SOCIETY, LATE SURGEON
UNITED STATES ARMY, ETC.

[Reprinted from the Transactions of the American Medical Association, 1878.]



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THE RADICAL CURE OF HERNIA.

OCTOBER 11, 1871, I read a paper before the Middlesex County Medical Society, which was afterward published in the Boston Medical and Surgical Journal, November 16, 1871, page 315, entitled "A New Use of Carbolized Catgut Ligatures." I there reported the two following cases, operated on for strangulated hernia.

CASE I. "On the 19th of last February I was called in consultation by Dr. A. P. Clarke, of Cambridge, to see Mrs. M., aged sixty, who had for years suffered from hernia. Five days previously she had been seized with severe pain in the inguinal region, accompanied with vomiting, and had been confined to her bed since that time.

"Long-continued and careful taxis had failed to reduce the hernia, and for twenty-four hours the vomiting had been stercoraceous, and the patient seemed *in extremis*. The hernial tumor was of the size of an egg, protruding from the external inguinal ring. A careful dissection exposed the sac, which was closely adherent to the surrounding parts. The constriction was in the ring, bounded below by Poupart's ligament, and above by the transversalis fascia and conjoined tendon.

“The stricture was divided in the usual way, with the hernial knife carefully introduced upon the finger. This was accomplished with some difficulty, owing to the constriction of the ring. The sac, unopened, was then pushed up with its contents into the abdominal cavity, and two stitches of medium-sized catgut ligature were taken directly through the walls of the ring. The wound was dressed antiseptically, and from Dr. Clarke’s notes, taken at the time, I find that the patient complained of no pain, steadily progressed without accident, and was discharged, convalescent, March 12th, three weeks after the operation.

“The wound did not close entirely by first intention, but a careful daily examination showed no trace of the ligatures, and an abundant deposition of new tissue could be felt in the line of the opening about the walls of the ring. The result was a radical cure of the hernia, and a firm, hardened deposit may still be felt marking the closure. The ligatures were first suggested to my mind, because the patient suffered severely from an asthmatic cough, and it was at least desirable to secure a temporary strengthening of the weakened ring.”

She died six years after the operation, and was troubled with the cough during the entire period, but had no return of the hernia.

CASE II. “Mrs. L., aged forty-five, had been very much reduced by excessive menorrhagia, and upon March 10, 1871, my attention was called to an old, direct inguinal hernia of the left side, usually supported by a truss, which had come down the night

previously and defied the patient's efforts to replace. After two attempts to reduce the hernia under ether had failed, assisted by Dr. W. W. Wellington, of Cambridge, I operated as in the first instance, dividing the constricting ring and replacing the sac and its contents unopened. Three carbolized ligatures were applied through the walls of the ring, and the wound was carefully dressed with carbolized lac plaster.

"As in the first case, there was complete absence of pain, the wound united without suppuration, there was an abundant deposit of new material about the ring, and when last examined in June, the cicatrix was linear, but a firm, hard deposit of new tissue could be felt marking the site of the sutures.

"On the 7th of April my attention was called to the wound by the patient, who felt a slight uneasiness, and I discovered a small swelling in the cicatrix about the size of a bean; this, upon being opened, discharged a drop or two of pale, serous looking fluid, which microscopic examination proved free from pus cells, but it contained a few shreds of connective tissue, which appeared to be minute portions of one of the ligatures. The cure is radical, and in neither case has the patient used a truss since the operation."

I then say, as far as my observation has extended, this is a new use of the carbolized catgut ligatures, and suggests a still wider field for application. No method of operation for radical cure of hernia appears more feasible, is probably attended with less danger, and at the same time affords a means of closing and strengthening the weakened ring, which is so desirable, and yet, with all the ingenious devices of sur-

gery, is so difficult to obtain. As perhaps might have been expected, the article attracted very little attention, written by a young man fresh from his European studies and an ardent admirer of Professor Lister, whose views at the time, I believe, were not accepted by a single surgeon in the Boston district.

In these days of improved means for the reduction of hernia, by the use of ether, by aspiration, and by rest with the hips higher than the shoulders, with the ice-bag applied locally, the surgeon in private practice is called upon to operate for the relief of strangulated hernia much less frequently than formerly. As far as I remember, I have operated for strangulated hernia only four times since the publication of this paper, and these cases were treated substantially as those above given. The last case, inasmuch as it affords the opportunity of showing the result anatomically, merits a careful study, and causes me to bring the subject to your attention now.

Mrs. W., aged seventy, had been for many years an invalid from double inguinal hernia, the right side being of such proportions that, after many endeavors to retain it by a truss, this appliance had been thrown aside as useless. On the left side was an irreducible omental hernia, at times complicated by the escape of a loop of the intestine through the ring. Nausea and vomiting had persisted for thirty-six hours before the operation.

As usual, antiseptic precautions were used, with carbolyzed spray and careful dressings. After slightly enlarging the ring, the intestine was easily reduced,

but the omental portion, the size of a small orange, presented a number of bleeding points upon its being unraveled, and was adherent to the walls of the ring. Because of this, the whole mass was tied with catgut and removed, the ring was carefully closed with catgut sutures of a large size, No. 2, I think, five in number. The wound healed by first intention throughout. Temperature never exceeded 99° F.

The patient suffered no pain, and made a perfect recovery. She was allowed to get up in two weeks, and never wore a truss. She was so much pleased with her happy escape from danger and her complete cure that she besought the privilege of being operated upon for the radical cure of the right side. I tried again a series of trusses, but to no avail, and after careful reflection consented to perform the operation. This took place February 4, 1878. The abdominal wall was thin, the ring extremely large, and its pillars were attenuated. The sac was readily returned unopened, and sutures were used as upon the other side, perhaps eight in number. I included in my stitches as much tissue as possible, but at the close of the operation felt the cure less satisfactory because there was so little material to fill in and support the weakened ring.

The union was entirely by first intention, leaving, as before, a linear cicatrix which never suppurated. There was no elevation of temperature, and the patient made a rapid recovery. During the first week there was considerable swelling of the tissues about the ring; these parts were slightly tender

upon pressure; and, what I believe to have been the thickened returned sac could be felt through the attenuated relaxed abdominal walls. The patient was kept in bed three weeks; but upon being permitted to get up it could be easily seen the cure was not complete, for there was impulse on coughing and a slight protrusion through the ring. She was fitted with a light truss, which easily retained the hernia, and was allowed to go about the house. She died suddenly, April 17, 1878, and the autopsy revealed an aneurism of the internal carotid of the right side, which had given rise to scarcely any symptom, except a gradual loss of vision of the right eye, but its existence had not been suspected.

The specimen here presented shows the walls of the ring much thicker than before the operation, and its calibre diminished perhaps two thirds. A light truss would probably have been sufficient easily to hold the parts in their proper relations.

The use of animal ligatures in surgery is by no means new. In all probability catgut, the form of animal thread or ligature which has been most frequently used in modern times, was employed as surgical sutures eight or nine hundred years ago. The celebrated Arabic writer, Rhezieus, who practiced in Bagdad about A. D. 900, speaks of stitching up wounds of the abdomen with a thread made of the string of a lute or harp; and another Arabic author, Albucasis, who lived a century or two later, alludes in the same class of injuries to stitching a wounded bowel with a fine thread made of the twisted intestine of an animal. The strings of the

ancient Egyptian harp, and hence probably of the Arabic, were made of catgut. Homer, in the *Odyssey*, speaks of the strings of the old Greek harp as made of the twisted intestine of the sheep.

Catgut was suggested as a proper substance for sutures and ligatures by the learned Dr. Thomas Young, of Edinburgh. See his *Introduction to Medical Literature*, 1813, p. 448, where he says, "I have often wished to try ligatures made of catgut which might be absorbed." In the *Edinburgh Medical and Surgical Journal* for 1818, vol. xv., p. 155, he states that he had proposed catgut ligatures to several surgical friends ten years previously, or in 1808.

To Dr. Physick, of Philadelphia, is undoubtedly due the honor of having first introduced animal ligatures into surgical practice. His ligatures were made of chamois leather. Silk may be considered an animal product, but however used, even when carbolized and inclosed in a wound which readily heals by first intention, the softened fibres usually act as an irritant, and are later discharged by the processes of suppuration. Animal tissues made but indifferent ligatures; and were practically long since abandoned. They were soft, slippery upon being immersed in water, and were by no means strong.

To Professor Joseph Lister we are indebted for a most important modification of the catgut ligature. In his enthusiastic devotion to his new ideas of the possible repair of tissue, he had observed that, under antiseptic dressings, clots of blood and large pieces of dead skin and other tissues had disappeared without suppuration; therefore he inferred that small

pieces of animal texture, if applied antiseptically, would be similarly disposed of. To make catgut antiseptic, he immersed it, as prepared for the violin, in a strong watery solution of carbolic acid, and noticing the changes which followed in its texture, after considerable variety of experiments, he gave us the ligatures as at present used. They are prepared by immersion of the gut in a mixture of five parts of fixed oil, olive or linseed, to one part of the crystallized acid, liquefied by the addition of five per cent. of water. After a few weeks' suspension in this fluid, the catgut becomes translucent, firm, hard, but moderately pliable, makes a strong knot, and upon immersion in water, or the fluids of the body, it undergoes no immediate change, and for days together the knots retain a firm hold.

There is considerable difference in the catgut thus prepared. That which I have used I obtained eight years ago from Professor Lister's own manufacturer, and I think it improves by age. It is certainly quite different in appearance from that supplied by Codman & Shurtleff of Boston. The latter is less firm, has a paler color, and is much more pliable. This may possibly explain one source of dissatisfaction on the part of some surgeons who have used the ligatures thus prepared. To show the importance of the proper preparation of the ligature, I quote from Professor Lister's original paper, published in *The Lancet*, April, 1869: "But for the sake of surgeons who may wish to prepare it for themselves, it is necessary to mention, in order to avoid disappointment, that the *essence* of the process is the *action* of an *emul-*

sion of *water and oil* upon the *animal tissue*. The same effect is produced upon the gut, though more slowly, by an emulsion formed by shaking up simple olive oil and water, as by one which contains carbolic acid.

On the other hand, an oily solution of carbolic acid without water has no effect upon the gut beyond making it antiseptic, and if water be added only in the small proportion which the acid enables the oil to dissolve, though the gut is rendered supple, and acquires a dark tint from the coloring matter of the oil, it will be found, even after steeping for months in such a solution, that when transferred to water it swells up and becomes soft, opaque, and slippery, as if it had not been subjected to any preparation. How it is that an emulsion produces this remarkable change in the molecular constitution of the tissue I do not profess to understand. I was at first inclined to regard it as a closer aggregation of the particles, brought about by a kind of slow dying of the moistened gut in the oil, as the watery particles precipitate to the bottom of the vessel; but, not to mention other circumstances opposed to this view, the oil remains turbid for a very long time, the finer particles of water being extremely slow in precipitating, and if, after the lapse of weeks, a piece of dry, unprepared gut is suspended in it, the thread is soon rendered soft and opaque by the very liquid in which gut which has been longer immersed is growing constantly firmer and more transparent.

“It is necessary that the gut be kept suspended so as not to touch the bottom of the vessel, for any

parts dipping into the layer of precipitated water would fail to undergo the change desired.

“The vessel containing the emulsion should be kept undisturbed, for if the water is shaken up with the oil the process is retarded. An elevated temperature, of about 100° F., seems for a while to promote the change, but ultimately leaves the gut in an unsatisfactory state compared with that obtained at an ordinary temperature ; and conversely, some portions of gut which I have prepared in a room without a fire, in cold weather, at a temperature of about 46°, were in one week already in a trustworthy condition for surgical purposes. Hence the gut should be prepared in as cool a place as possible. The longer it is kept in emulsion the better the gut becomes. I once feared that in time it might grow too rigid for convenience, and possibly brittle also ; but experience shows that this is not the case.

“When removed from the emulsion it soon dries in the air, but retains a considerable portion of its carbolic acid for several hours, so that no apprehension need be entertained of loss of its antiseptic property from exposure during the performance of an operation. In course of time it loses all the carbolic acid also, but retains permanently its altered molecular condition. If thus kept dry, as may prove the most convenient for the manufacturer on a large scale, it must be steeped thoroughly in some antiseptic lotion before its use. And for the surgeon the most convenient way will probably be to keep it always in the antiseptic emulsion, so as to be ready for use whenever it is required.”

Dr. D. W. Cheever, of Boston, writes me under date of May 14, 1878: "I tried catgut for a radical cure of hernia, but it was speedily absorbed and failed." He is unable to give me particulars with regard to the use of the ligatures.

Dr. J. C. Warren wrote me a few days since: "I should fear that they would not hold long enough to keep the parts in apposition until union becomes firm. We have given up their use at the Massachusetts General Hospital for this reason: they do not hold longer than four days."

In the Toledo Medical and Surgical Journal for May, 1878, I find an editorial review of an article published by Prof. E. W. Jenks, of Detroit, "Upon Sutures of the Uterus in the Cæsarean Operation," in which the reviewer states that he has changed his opinion concerning catgut ligatures, and condemns their use. Theoretically, he says, catgut is the best material because of its innocuity and of its ready absorption, but practically he believes it the worst of any, as no one has yet devised a knot which the heat and moisture of the peritoneal cavity will not cause to relax, and it is then rendered useless. He has employed catgut to ligate intra-peritoneal vessels in an ovariectomy where post-mortem examination revealed not only that the knot was untied, but that it was less innocuous than silk used at the same time. He also quotes from the Transactions of the Obstetrical Society of London, in which Drs. Routh, Meadows, and others give opinions unfavorable to the use of catgut for uterine sutures. Dr. Meadows mentions two cases of death after Cæsarean section, attributable

solely to the use of the catgut for closing the uterine rent. Among authoritative works on this subject, I am glad to be able to include this recent publication from such a careful, conscientious observer, for it accords in certain respects with studies of my own. I believe there are distinct limits to the usefulness of the catgut ligature, and if our profession early learns to know what these limits are, not only may the lives of our patients be less endangered, but an aid to surgery which now promises much of good will be rescued from wholesale condemnation and oblivion. In plastic operations, especially of mucous tissues, I would never think of using catgut ligatures.

In wounds exposed to the air, or liable to suppuration, where the ligatures are soaked in fluid secretions, I am well aware the catgut knot is liable to become loose ; but in the antiseptic ligation of vessels, or the closure of deep-seated tissues, it is far superior to any other. Here, when properly applied, it is open to few of the objections made. Owing to the firm character of the material, circulation of the inclosed part is more liable to be impeded than with silk ligatures, and hence care should be exercised ; but within the limits here assigned, an experience of eight years justifies their use.

In the Boston Medical and Surgical Journal of May 8, 1879, in the report of surgical cases of Dr. Geo. W. Gay, there is given at length the history of a case of popliteal aneurism relieved by ligation of the femoral arteries with catgut ligature. "The wound closed by first intention and the ligature was never seen after the operation." In commenting

upon the case the writer states, "The happy result following the use of the catgut ligature is worthy of notice. It is hardly possible to get a wound with ligatures hanging from it, to unite by first intention. In many operations primary union would be obtained were it not for the silk with which the vessels are secured. Torsion in these cases is tedious and uncertain. But good catgut carefully tied by three square knots, and the ends cut short, allows the wound to be closed throughout its whole extent. This material has been in use over two years in the City Hospital, and thus far it has always been satisfactory."

I have repeatedly ligated arteries with catgut with like result. For a large gluteal aneurism, I placed a double catgut ligature upon the vessel not far from its origin. The patient was a muscular sailor, the wound large and deep; the pyriformis muscle was divided in order to bring the vessel into view. The treatment was antiseptic. The temperature remained normal and union was by first intention throughout, and no trace of the ligature ever seen. The patient has resumed his vocation.

Judging from my own observation I am inclined to believe the ligature properly, that is antiseptically, used is not absorbed at all, but is changed particle by particle, being in this way not revitalized but replaced by living tissue, thus producing a reinforced band of new connective tissue in place of the ligature itself.

The specimens here shown I think demonstrate this. The one last operated on, February 5th, death

taking place April 17th, namely, sixty-eight days after the operation, shows unmistakable thickening of the connective tissue about the ring; and there are yet seen, although preserved in a bichromate of potassa solution, hence less distinctly than at the autopsy, traces of the ligatures. These are of a darker color than the surrounding parts, retain imperfectly the shape of the ligature, and are of considerably greater density and firmness. Under the microscope they show only wavy bundles of connective tissue. In the older specimen operated on December 2d, after the lapse of four or five months, you can no longer trace constricting fibres in the shape of circumscribed bands, but you will find a firm reinforcement of the parts by connective tissue, which certainly includes the walls of the ring, and hence we infer it is developed about, or transformed from the ligatures themselves. This quite accords with Mr. Lister's experiments in the ligature of arteries.

From the article previously mentioned I quote as follows: "Thirty days after the operation, the animal, a calf, which had continued in perfect health, was killed, and the parts removed for examination. On dissection I was struck with the entire absence of inflammatory thickening in the vicinity of the vessels, the cellular tissue being of perfectly normal softness and laxity. On exposing the artery itself, however, I was at first much surprised to see the ligatures still there, to all appearance as large as ever. But from my other experiments, it might have been anticipated that the ligatures of peritoneum and cat-gut placed on the calf's carotid would, after the

expiration of a month, be found transformed into bands of living tissue. Such was in truth the case, as was apparent on closer examination."

Mr. Fleming published in 1876, in the *Lancet*, a series of observations upon the "behavior of carbolized catgut inserted among the living tissues," and gives his results confirmatory of such change. "A softening takes place from without in, the catgut breaking down and becoming infiltrated with cells. The mass into which it has been converted begins to metamorphose and is soon permeated with blood channels, and ultimately may be described as a cast of the catgut in a kind of granulation tissue, freely supplied with blood vessels, which in many of my sections are easily injected." These views should not seem exceptional, when we remember many well-known facts, for example, that the revivifying of skin dead at least by separation for a considerable period, as in that from an amputated limb, goes on so uniformly that transplantation of it upon granulating surfaces, and these not best fitted for its growth, has now become a daily practice in surgery.

Even the epithelial cells removed by a considerable distance from the circulation, and already dead, thus live again, and multiply so rapidly as to be of practical use in the repair of large denuded surfaces. The periosteum, as Ollier and others have shown in their experiments, may be also transplanted, and not only live but become an active factor in the reproduction of bone ; and teeth have been removed, filled, and replaced, actually transplanted to other locations, and regained their lost relationship of nutrition.

The spurs of the cock, as observed by Baronius, when transplanted to the comb, not only live, but remarkably increase in size, and when ingrafted into the ears of oxen, as is practiced in Mexico, they attain a size truly wonderful.

Mantegazza described and figured one of these spurs, which in its dry state weighed nearly one pound (396 grammes), was twenty-four centimetres in height, and twenty centimetres in width.

If such wonderful activity of reproduction and growth are shown by these tissues, there would appear to be no reason why the cells of the fibrous tissues might not also undergo changes in nutrition equally remarkable, of which practical advantage may be taken. Dr. Hodgen, of St. Louis, in his valuable address on surgery delivered before the International Medical Congress at Philadelphia, 1876, says that the late Prof. Paul F. Eve, of Nashville, Tenn., informed him that for forty years he had been in the habit of using the sinews of the deer for ligating vessels. "I have never used carbolized spray. The tendons of the deer, dried and torn into shreds and rolled into ligatures, are what I employ. They are absorbed; I have accordingly used them as sutures." Professor Lister, in his address on Antiseptic Surgery, Transactions International Medical Congress, 1876, page 538, says: "I have been making strenuous efforts to improve the catgut ligature, and believe that I have at last obtained the desired result. Old ligature is far preferable to new, and yet the knots will sometimes loosen. I have seen a case of Cæsarean section progress admirably until the stitches in the uterus

gave way, and then death speedily followed. The old ligature is harder, and does not absorb as readily as the new, but I have found that gut which is reliable when tested with warm water will yet loosen under the action of the liquor sanguinis. The ligature must not be made too hard, or it will be too stiff for tying, and will even act as a foreign body as much as silk does, and yet it must be so hard that after soaking in serum for weeks it will still hold firmly. I have tried many substances: chromic acid will harden the gut, but when the latter is soaked in serum it is as unsatisfactory as before; glycerine gives a ligature which will knot well, but is still too hard. I have at last made a mixture of carbolic acid, glycerine, chromic acid, spirit of wine, and water, which I think will prove the very thing required. The ligature which I show has been soaked a month in serum, and yet the knots are perfectly firm."

This is not the place, nor have we the time for a careful review of the history of the various devices suggested for the radical cure of hernia. For centuries this has been a prolific field for charlatans and for quacks of every description. Hernia-curers roamed over Europe a century ago, practicing castration and various reckless and dangerous devices, at the cost of many lives, and, it is needless to say, with the performance of few cures.

Within the present century many of the best surgeons have given this subject careful study, and some of the most ingenious of surgical devices have been brought into requisition. Nearly all of them have sought to accomplish a cure by one of two ways:

either by producing adhesive inflammation and obliteration of the sac, or by producing closure of the ring. Monsieur Bennet inclosed the cord between pins fastened to rolls of linen. Gerdy plugged the ring with invaginated skin held by stitches, and afterwards, with the object of correcting the tendency of the invaginated skin to be withdrawn, cut it free, and ended with a plastic operation, by raising a flap from below. This method was often successful in his hands, but its complication and dangers prevented its general adoption.

Belmas invented an instrument, consisting of a canula with stylets. Through the passage in the canula threads of gelatine were to be introduced and be ultimately absorbed, after having produced the requisite adhesive inflammation. Then he applied a truss.

The operations of Velpeau, Wützer, and Wood are better known. Mr. Wood operated about two hundred times, with the result of three deaths and about seventy-five per cent. of reported cures. Acupuncture, a revival of the punctum aureum of the ancients, as practiced by Dr. Pancoast of Philadelphia, though unsuccessful as a means of cure, suggested to him, as well as to Dr. Young of Tennessee, the use of subcutaneous injections of iodine or cantharides into the sac. A number of successful cases thus operated upon are reported.

This method was practiced for many years as a secret cure by Dr. Heaton of Boston, with reported success. Recently he has published a monograph upon hernia, in which he gives a detailed account of his treatment and experience. He reports a large

number of cures, and claims that his method is devoid of danger. It consists of a fluid extract of white oak bark injected with a hypodermic syringe into the sac. This method has been tried with moderately successful results at the Boston City Hospital. By means of it, a considerable amount of thickening and narrowing of the ring is certainly produced.

In 1858 Dr. Gross, in two cases, cut down upon the ring and brought together its walls with silver sutures. A cure followed in both cases. In 1871 Dr. Van Best reported three cases operated on for radical cure by a subcutaneous sewing of the ring with salmon gut. Two of these cases were successful.

Dr. G. Dowell, professor of surgery in Texas Medical College, published a treatise on hernia in 1877, and describes a new method for its radical cure. He there reports sixty-eight cases with sixty permanent cures, and at the date of this publication, he informs me the number of his operations exceeds one hundred. By a needle of peculiar construction he subcutaneously sews the pillars of the ring with silver wire. The testimony of such an indefatigable student, with his very large experience and remarkable results, is of the greatest value.

Mr. Charles Steele, of Bristol, reported in the *British Medical Journal*, November 7, 1874, a successful case of radical cure of hernia, which was operated on precisely as were my own cases. The patient was a boy of eight. The surgeon used two stitches of catgut antiseptically, and union followed by first intention. After six months the hernia returned, and the operation was repeated. A truss was applied for

safety. A perfect cure, was effected, in the judgment of the operator, a year later.

Nearly all the late writers on surgery, such as Bryant and Erichsen, deprecate any attempt to secure the radical cure of hernia, except in severe cases; and Mr. Bryant regards the supposed elongation of the mesenteric ligament as a probable cause of the imperfect results obtained by various operators, but he supports his proposition neither by theory nor by fact. If the operation which I have proposed is done properly, with antiseptic care, I believe that to a great extent it is devoid of danger. In a series of papers upon strangulated hernia, based upon one hundred operations performed by himself, published in the *British Medical Journal* for 1872, Sir James Paget, in advocating the replacing of the sac unopened if possible, says: "The structures divided externally to the sac are insignificant; and it might be difficult to name an operation less endangering either life or health than this would be. The peritoneum is not wounded; the intestine or omentum is not touched or exposed to the air; the wound may be small; any hæmorrhage may be easily stayed and must be all external. Thus the wound is favorable to speedy healing, and erysipelas or any other mischief is not likely to extend to the peritoneum."

I would not appear over sanguine in the suggestion of any new method for the radical cure of hernia. I am perfectly aware that this has ever been one of the most troublesome and unsatisfactory problems in surgery; and my experience has been too limited to prove little except possibilities.

However, I must claim a favorable consideration, on a legitimate field, for the use of the carbolized catgut ligature, at least in all cases of strangulated hernia where the wound can be closed. This method does not add to the dangers of the operation, and is probably followed by a cure. In comparing the operation with that usually recommended, of subcutaneously stitching the ring with sutures of any material, it seems apparent that to cut down upon and expose the ring gives a much better opportunity of carefully closing it, refreshing its borders, and thus avoids injury to the spermatic cord, while it does not increase the danger of the patient.

If these views are unsound, let their publication provoke criticism, and lead to such investigation as shall expose their futility. But if they are correct the testimony of other observers will confirm them, and enable the divine Art of Healing to take one more step in the direction of progress.



